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# Scientific Note

## *Tilloidea notata* (Klug) (Coleoptera: Cleridae), as a Predator of *Stegobium paniceum* (Linné) (Coleoptera: Anobiidae)

As has been reported recently (Iwata, 1988, Acta Coleopterol. Jap., (1):1–133), artificial diet blocks, prepared and stored for *Lyctus brunneus* (Coleoptera: Lyctidae) (composed of soluble starch, brewer's yeast powder, cellulose powder and *Shorea* wood sawdust), were observed to be infested by the drugstore beetle, *Stegobium paniceum* (L.) (Coleoptera: Anobiidae) in Wood Research Institute, Kyoto University, Uji, Kyôto, Japan. Hence a culture of this anobiid, *S. paniceum,* was established by using the above artificial diet blocks for lyctids. The culture was contained in a very large glass vessel, in the shape of a tall Petri dish, 20 cm in diameter and 10 cm high, with a glass cover. It was placed in a non-climatised room of the laboratory. This culture had been kept almost untouched.

Two years after starting this anobiid culture, when the population density of *Stegobium* was very high, some strange aliens, ca. 6 mm in size, were found walking around inside the vessel. They were identified as adults of *Tilloidea notata* (Klug), a clerid species found in Japan only rarely in its southern part. This species, often designated as *Tillus notatus,* is known to be a predator of wood-boring beetles of the genera *Lyctus* (Lyctidae), *Sinoxylon, Dinoderus,* etc. (Bostrychidae) in India (Beeson, 1926, Ind. For. Rec., 12:217–231). On the other hand, this clerid has never been found associated with any anobiid species although in Middle and South China, according to Chén and Huáng [1985, Cāngkù Kūnchóng Túcè (Illustrated book of storehouse insects), Science Publisher, Peking, p. 78], it is associated with stored cassava roots, which are very likely to be attacked by some anobiids. The coloration pattern of the adult beetle is to be referred very obviously to mimicry or convergence among various subfamilies of Cleridae, which was discussed by Menier (1985, Bull. Soc. Entom. Fr., 90:1071–1083, 1167).

The data of collection in Uji are as follows: 3 exs., Kyoto University, Uji Campus, Uji, Kyôto, Japan [9 June, 15 June and 18 June 1981 (one specimen for each date)], R. Iwata leg., in R. Iwata's and K. Hosokawa's collections. This species seems new to Kyôto Prefecture, Japan.

It appeared quite curious since no chance of invasion of such an organism was thought possible because of the conditions of the culture: there had been observed no escape of *Anobium,* whose size is much smaller than *Tilloidea.* Careful examination of how *Tilloidea* came to invade the *Stegobium* rearing vessel revealed that this vessel, when closed with the glass cover, admits only very minute organisms, such as mites, and the *Tilloidea's* invasion could occur only when the female adult beetle could manage to insert her ovipositor into the very narrow gap between the glass vessel and the glass cover.

Then, if this is the case, how the female of *Tilloidea* came to recognize the mass population of *Stegobium* should be considered. The most likely hypothesis is that *Tilloidea* was attracted by *Stegobium*'s scent, namely the kairomone. This hypothesis could be supported, although indirectly, by the following findings: firstly, *S. paniceum* has been demonstrated by Kuwahara et al. (1975, J. Chem. Ecol., 1:413–422; 1978, Tetrahedron, 34:1769–1774) to possess its sex pheromone,

which is likely to act as a kairomone; secondly, a female of *Cephalonomia gallicola* (Ashmead) (Hymenoptera: Bethylidae), a parasite wasp of *S. paniceum,* was observed by Itoh (1980, Jap. J. Sanit. Zool., 31:296–298) to be attracted to an empty cocoon of *Anobium* as well as to one with a larva inside, suggesting a presence of kairomone for that wasp; and lastly, Grace and Wood's (1985, Pan-Pac. Entomol., 61:348) observation suggested kairomonal mediation in the attack of another clerid beetle, *Paratillus carus* (Newman), against *Lyctus brunneus* adults as its prey, in which a kind of pheromone was shown to be present by Iwata (op. cit.), as well as in *Stegobium.* This situation might be applied also to the present case with *T. notata* vs. *S. paniceum.*

In addition, the coloration of the *T. notata* adult would be of interest. The coloration of its elytra seems rather significant from the viewpoint of mimicry, and thus is expected to be nonvariable, while, as Beeson (op. cit.) reported, the head and pronotum coloration is somewhat variable. In all of the above-mentioned 3 specimens from Uji, Kyôto, the head and pronotum are entirely black (Beeson's fourth type). The author had an opportunity to examine specimens of *T. notata* from Tondabayashi, Osaka, Japan (20 July 1980, H. Kuriki leg.), which seemed associated with *Lyctus brunneus* population occurring simultaneously. Of these, one is assigned to be the 4th type, and two to be Beeson's 3rd type with the head and anterior edge of the pronotum being entirely black and the rest being red. It is interesting that in India the 3rd type is the commonest (77%) and the 4th type is rare (4%) (Beeson, op. cit.), while in Japan the tendency might be quite different. Examination of further specimens from Japan is needed to know the real tendency.

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